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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/555,898	12/23/2005	Naoyuki Ochi	441P099	4448

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EXAMINER	
HON, SOW FUN	

ART UNIT	PAPER NUMBER
1794	

MAIL DATE	DELIVERY MODE
09/11/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/555,898	OCHI ET AL.	
	Examiner	Art Unit	
	SOPHIE HON	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03/04/08*.

2a)☒ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/8/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Withdrawn Rejections

1. The objections to claims 4-15 are withdrawn due to Applicant's amendment dated 03/04/08.

2. The 35 U.S.C. 103(a) rejection of claims 1-3 over Kitamura is withdrawn due to Applicant's amendment dated 03/04/08.

New Rejections

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-3, 7-8, 12, 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steinberg (US 3,450,613) in view of Chern (US 4,297,401), as evidenced by Gander (US 3,853,962) and Heucher (US 5,902,849).

Regarding claim 1, Steinberg teaches a sealant (cement, abstract) comprising as an essential ingredient (a) a radiation curable resin represented by Applicant's general formula (1), where R^1 of Applicant = hydrogen atom, R^2 of Applicant = hydrogen atom, R^3 of Applicant = methyl group, which is inherently the condensation product of the two reactants resorcinol diglycidyl ether and methacrylic acid (Example 10, column 4, lines 60-65), where n of Applicant is within the claimed range of 0 to 20, as evidenced by Gander.

Gander teaches that resorcinol diglycidyl ether condenses with methacrylic acid (column 2, lines 55-68) to form the dimethacrylate of Applicant's formula (1) (column 3, lines 1-10), where R^1 of Applicant = hydrogen atom, R^2 of Applicant = hydrogen atom, R^3 of Applicant = methyl group, and where n of Applicant = 0.

In addition, Steinberg teaches that the sealant further comprises as an essential ingredient (b) a radical photopolymerization initiator (benzoin, Example 10, column 4, lines 60-68). Steinberg fails to teach that the sealant comprises (c) an inorganic filler having an average particle diameter of 3 μm or less.

However, Chern teaches a sealant that comprises as an inorganic filler to alter the viscosity of the sealant for the purpose of providing ease of screen printing, one such as Cab-O-Sil (column 4, lines 5-15) which is a silica that has an average particle diameter within the claimed range of 3 μm or less, as evidenced by Heucher.

Heucher teaches that Cab-O-Sil silica has an average particle size within the range of 0.007 and 0.05 μm (column 2, lines 42-52).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided the sealant of Steinberg with (c) an inorganic filler having an average particle diameter of 3 μm or less, as an essential ingredient, to alter the viscosity of the sealant in order to obtain the desired ease of screen printing, as taught by Chern, as evidenced by Heucher.

The recitation of "for liquid crystals" is one of an intended use of the claimed invention which must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If

the prior art structure is capable of performing the intended use, then it meets the claim. In the instant case, the sealant of Steinberg is an optical sealant used in optical elements (cement, column 1, lines 20-25), and as modified by Chern, has the claimed composition.

Regarding claim 2, Steinberg teaches that the methacrylic acid reactant can be replaced by acrylic acid (Example 9, column 4, lines 50-60) resulting in R^3 of Applicant = a hydrogen atom instead of a methyl group in general formula (1) of Applicant, and hence meets the more specific formula (2) of Applicant where p of Applicant = n of Applicant, is within the claimed range of 0 to 20.

Regarding claim 3, Steinberg teaches that the radiation curable resin (a) has a content of 88 % by weight based on the total amount of sealant (1.87gr/[1.87 + 0.253], Example 9, column 4, lines 50-60), and thus fails to teach that it is within the range of 30% to 80%.

However, Chern teaches that a sealant composition further comprises other additives, for the purpose of providing a sealant that is suitable for a liquid crystal display cell (abstract) so that the radiation curable resin only makes up 89% to 58% by weight of the total amount of sealant (column 11, lines 1-15). This means that the optical sealant of Steinberg, as modified by Chern, can contain the radiation curable resin (a) in a modified amount of 58% to 89%, which overlaps the claimed range of 30% to 80%.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided the radiation curable resin (a) in a

modified amount that is within the range of 30% to 80% in the optical sealant of Steinberg, to accommodate other additives in order to provide a sealant suitable for a liquid crystal display cell, as taught by Chern.

Regarding claims 7-8, Steinberg teaches that the sealant can further comprise (e) a heat-curing agent (methylsuccinic anhydride, Example 9, column 4, lines 50-60, curing agent such as acid anhydride, cure may be effected by heat-, column 1, lines 69-72, ing a mixture of epoxy resin prepolymer and the curing agent, column 2, lines 1-10). Steinberg teaches that a reacted resin was obtained after 45 seconds of exposure (gel, Example 9, column 4, lines 50-60), which means that the composition now further comprises (d) an epoxy resin that is crosslinked (gel, Example 9, column 4, lines 50-60). Since the epoxy resin is crosslinked, it is expected to not elute into the liquid crystals in an amount that is within the range of 0.5% by weight or more based on the liquid crystals in the instance when the epoxy resin is brought directly into contact with the liquid crystals whose amount is 10 times of the epoxy resin and is allowed to stand at 120°C for 1 hour.

Regarding claim 12, Chern teaches that the sealant further comprises (f) a silane coupling agent for the purpose of improving the adhesion of the sealant to the liquid crystal display cell substrate (column 10, lines 1-15).

Regarding claims 14-15, Steinberg fails to teach a liquid crystal display cell which is sealed with a cured product of the sealant discussed above, or a process for producing it.

However, Steinberg teaches that the sealant is an optical sealant highly suited for use in the manufacture of optical elements in an automated process (cement, column 1, lines 20-35) wherein the sealant comprises the condensation product of resorcinol diglycidyl ether and methacrylic acid, as discussed above.

Chern teaches that a liquid crystal display cell (column 1, lines 5-15) which is a species of optical element, is sealed with a cured product of an optical sealant that comprises a radiation curable resin (column 1, lines 5-15) that can be a product of resorcinol diglycidyl ether (Kopoxite, column 6, lines 53-55) and acrylic acid (acrylic acid ester of glycidol, column 6, lines 55-56) which is a homolog of methacrylic acid. Chern teaches a process for producing a liquid crystal display cell comprising dropping liquid crystals inside the cured product sealant for liquid crystal formed on a substrate and attaching another substrate thereto (glass plates were mated, and the resulting cells were subjected to radiation to cure the sealant, the sealed liquid crystal cells were filled with liquid crystal, column 13, lines 23-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have manufactured a liquid crystal display cell using a process for producing the liquid crystal display cell as taught by Chern, wherein the liquid crystal display cell is sealed with a cured product of the optical sealant of Steinberg, in order to provide the desired ease of manufacture in an automated manufacturing process, as taught by Steinberg.

4. Claims 4, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steinberg, as modified by Chern, as evidenced by Gander and Heucher as applied to claims 1-3, 7-8, 12, 14-15 above, and further in view of Kitamura (US 2002/0176046).

Steinberg, as modified by Chern, and as evidenced by Gander and Heucher, teaches the sealant for liquid crystals comprising as an essential ingredient (a) a radiation curable resin, as discussed above.

Regarding claim 4, Steinberg fails to disclose the viscosity of the radiation curable resin (a).

However, Kitamura teaches that a sealant for a liquid crystal display cell has a viscosity that is within the range of 5 to 1,000 Pa.s ([0081]) which contains the claimed range of 30 to 500 Pa.s., for the purpose of providing the desired balance between resistance to seal leak and gap control during the manufacture of the liquid crystal display cell ([0081]).

Therefore, since Steinberg, as modified by Chern, is silent regarding the viscosity of the radiation curable resin (a) in the optical sealant for liquid crystal display, it would have been necessary and hence obvious to have looked to the prior art for suitable values. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided the radiation curable resin (a) with a viscosity that is within the range of 30 to 500 Pa.s, in order to obtain the desired balance between resistance to seal leak and gap control during the manufacture of the liquid crystal display cell, as taught by Kitamura.

Regarding claim 13, Steinberg, as modified by Chern, teaches the addition of a silane coupling agent for the purpose of enhancing the adhesion of the sealant to the liquid crystal display cell substrate, as discussed above. Chern teaches examples of silane coupling agents that include glycidoxypropyltriethoxy silane (abstract), but fails to teach one that has an amino group.

However, Kitamura teaches that the silane coupling agent can be an aminopropyltriethoxy silane ([025]) in lieu of glycidoxypropyltriethoxy silane ([0248]) for the same purpose of providing the desired enhancement of adhesion of the sealant to the liquid crystal display substrate (composition, [0243], sealant composition for liquid crystal display cell, [0007]).

Therefore, it would have obvious to one of ordinary skill in the art at the time the invention was made, used a silane coupling agent that has an amino group as an alternate silane coupling agent in the sealant for liquid crystal display cell of Steinberg, as modified by Chern, in order to obtain the desired enhancement of adhesion of the sealant to the liquid crystal display substrate, as taught by Kitamura.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Steinberg in view of Chern, as evidenced by Gander and Heucher as applied to claims 1-3, 7-8, 12, 14-15 above, and further in view of Saint (US 6,156,816).

Steinberg, as modified by Chern, teaches the sealant comprising as essential ingredients (a) a radiation curable resin and (b) a radical photopolymerization initiator, as discussed above. In addition, Steinberg teaches that the (b) radical photopolymerization initiator can be a benzil initiator (column 5, lines 20-27). Steinberg

fails to teach that the radical photopolymerization initiator can also be a carbazole initiator.

However, Saint teaches that a carbazole initiator can be used in lieu of a benzil initiator for the purpose of providing the desired photopolymerization initiation conditions (benzildimethylketal photoinitiator, column 9, lines 15-30).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a carbazole initiator in lieu of the benzil initiator in the sealant of Steinberg, in order to obtain the desired photopolymerization initiation conditions, as taught by Saint.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Steinberg in view of Chern, as evidenced by Gander and Heucher as applied to claims 1-3, 7-8, 11-12, 14-15 above, and further in view of Tsubota (US 5,596,023).

Steinberg, as modified by Chern, teaches that the sealant that further comprises (d) an epoxy resin and (e) a heat-curing agent such as an acid anhydride, as discussed above. Steinberg fails to teach that the heat-curing agent (e) is a dihydrazide.

However, Tsubota teaches a sealant that comprises (d) an epoxy resin and (e) a heat-curing agent that can be a dihydrazide in lieu of an acid anhydride (column 4, lines 18-20) for the purpose of providing the desired heat-curing conditions.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a dihydrazide in lieu of the acid anhydride heat-curing agent in the sealant of Steinberg, in order to provide the desired heat-curing conditions, as taught by Tsubota.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Steinberg in view of Chern and Tsubota, as evidenced by Gander and Heucher as applied to claim 9 above, and further in view of Rogers (US 3,294,748).

Steinberg, as modified by Chern and Tsubota, teaches that the sealant that further comprises (d) an epoxy resin and (e) a heat-curing agent such as a dihydrazide, as discussed above. Steinberg, as modified by Tsubota, fails to disclose that the dihydrazide can be isophthalic dihydrazide.

However, Rogers teaches that a notoriously well-known dihydrazide heat-curing agent for an epoxy resin is isophthalic dihydrazide (column 2, lines 44-52) used for the purpose of providing the desired heat-curing conditions as well as the desired hardness (column 2, lines 45-55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a notoriously well-known epoxy-resin heat-curing agent such as isophthalic dihydrazide as an alternate (e) dihydrazide heat-curing agent in the sealant composition comprising (d) an epoxy resin of Steinberg, as modified by Tsubota, in order to obtain the desired hardness and heat-curing conditions, as taught by Rogers.

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Steinberg in view of Chern, as evidenced by Gander and Heucher as applied to claims 1-3, 7-8, 11-12, 14-15 above, and further in view of Seymour (US 5,526,940).

Steinberg, as modified by Chern, teaches that the sealant that further comprises (d) an epoxy resin and (e) a heat-curing agent such as an acid anhydride, as discussed

above. Steinberg fails to teach that the heat-curing agent (e) is a polyhydric phenol.

However, Seymour teaches that a composition that comprises (d) an epoxy resin contains (e) a heat-curing agent that is a polyhydric phenol (polyfunctional phenolic hydroxyl terminated hardener, column 2, lines 41-45) for the purpose of providing the desired adhesion combined with efficient curing and enhanced flexibility (column 2, lines 19-31).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a polyhydric phenol as an alternate heat-curing agent in the sealant of Steinberg, in order to provide the desired adhesion combined with efficient curing and enhanced flexibility, as taught by Seymour.

Response to Arguments

9. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number is (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks, can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sophie Hon/

Sow-Fun Hon

/KEITH D. HENDRICKS/
Supervisory Patent Examiner, Art Unit 1794